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...GY DEPARTMENT December 11, 1948

SCIENCE NEWS LETTER

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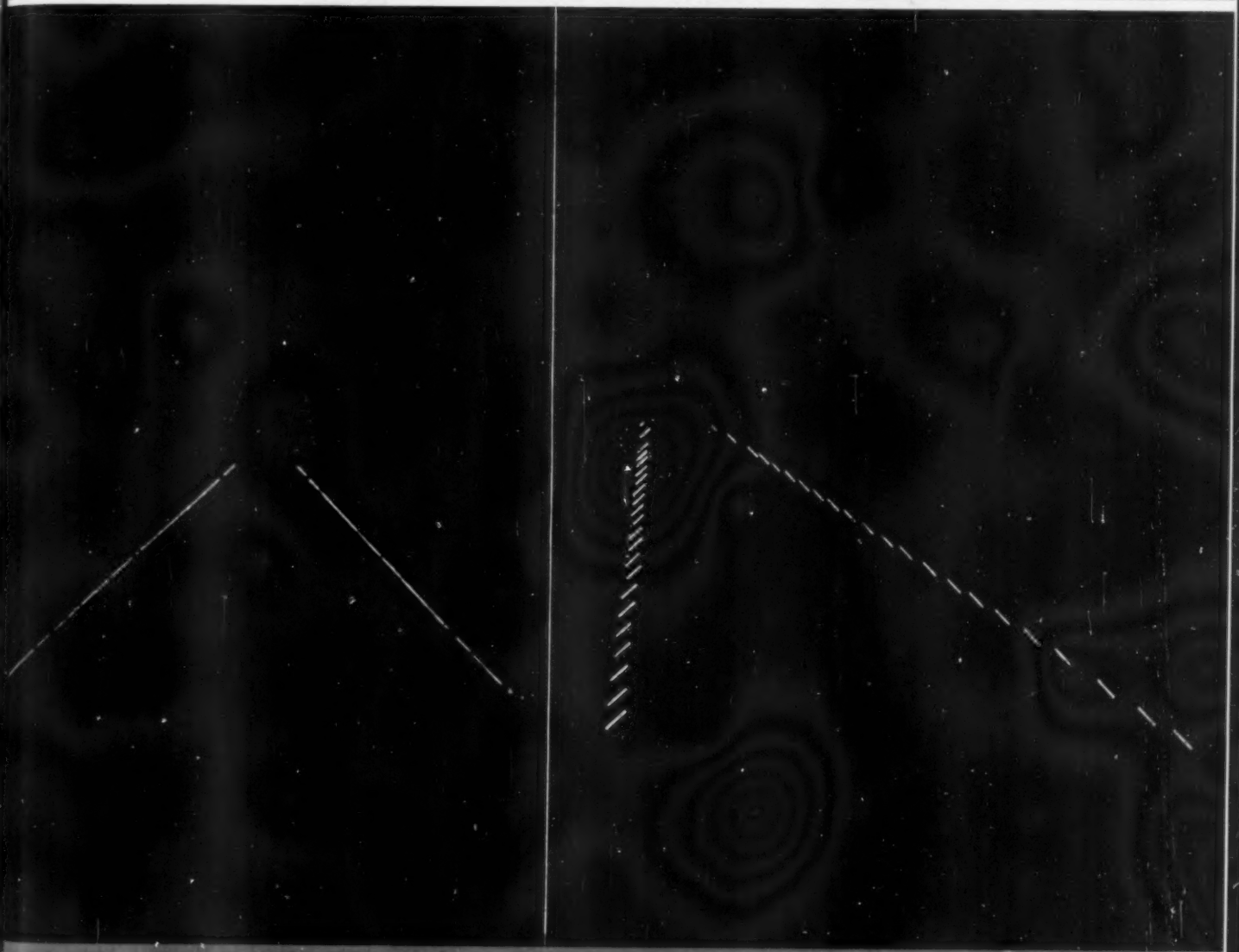

Aircraft Approach Lighting

See Page 371

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VOL. 54 NO. 24

RADIO

Radio Can Gage Radiation

By adding a low-voltage Geiger-Mueller tube to your home or car radio you can use it as a detector of radioactivity in event of an atomic attack.

➤ YOUR HOME or car radio can be used to detect the deadly radiations from an atomic bomb explosion. The only change required in most home radios—adding a detection tube—is so simple that you can probably do it, following simple directions.

How your radio can be converted into a radioactivity detector is described in a report by an atomic scientist, William D. Schafer. The report has just been declassified by the U. S. Atomic Energy Commission.

A low-voltage Geiger-Mueller tube, used in the famous Geiger-Mueller counters for detecting radiations, can be installed in your radio, the report explains. The tube can be installed in your home radio for detecting radiations and easily removed for listening to broadcasts.

In event of an atomic disaster in which radioactive clouds contaminate large areas, the home radioactivity detector would indicate the presence and intensity of contaminating radioactive dust by clicks or roars from the radio's loud speaker. The warning clicks might warn a family in time for escape to a shelter that is less radioactive.

You could easily check to see if your home radio-detector was working by holding a radium watch dial near the set. If the detector was working, even the tiny amount of radiation from a watch dial would cause a few clicks per minute in the loud speaker.

A special low-voltage Geiger-Mueller tube is necessary for the home radio-detector, because your radio ordinarily has no more than 300 volts in its circuits. Laboratory G-M counter tubes require 600 to 900 volts for correct operation. But the low-voltage tubes have been developed. They could be mass-produced, the report declares.

In the simplest home detector, all that is needed is a low-voltage G-M tube and a special tube socket adapter. One of the tubes is unplugged and the adapter inserted instead of the tube socket. Removing the adapter and replacing the tube would again permit you to hear broadcasts.

In addition to serving as a detector of radiation in event of an emergency, your car radio might be used in prospecting for radioactive mineral deposits. Standard batteries would be used to give a high-voltage supply for the car radio-detector.

Three methods of making your radio perform as a radioactivity detector are described in the report. One, best adapted to car radios, would be the more expensive.

Big advantage of the new system is, of course, that most families have radios. Now, the report indicates, if you have a radio you can also have a relatively simple but effective detector of radioactivity.

Science News Letter, December 11, 1948

MEDICINE

Medical Aid from Lemon

➤ A CHEMICAL from lemon peel may be an aid in overcoming the blood damaging effects of radiation injury, whether from atom bombs, through accidental exposure or in cancer treatment, it appears from experiments by Drs. William G. Clark, Rex P. Uncapher and Mary L. Jordan of the Scripps Metabolic Clinic and Scripps Memorial Hospital in La Jolla, Calif.

The lemon peel chemical given to guinea pigs in their drinking water cut the mortality of the animals by about half when they were exposed to total body irradiation from X-rays, the scientists report in the journal, SCIENCE (Dec. 3).

An X-ray dose that killed 30 out of 45 untreated animals killed only nine of 26 that had been given the lemon peel chemical. The hemorrhagic symptoms of the treated animals were considerably less marked than those of the untreated.

The lemon peel chemical used is calcium flavonate, a substance like vitamin P. Its value for cancer patients would be that with it they could safely be given larger doses of X-rays in treatment.

Further practical advantage of the research is that it seems to show that smaller laboratory animals than the dog can be used in studies of this sort.

Science News Letter, December 11, 1948

CHEMISTRY

Shine Taken from Pants by Permanent Waving Fibers

➤ THE SHINE can now be removed from pants or skirts by putting a permanent wave in the fibers.

A new acid-and-abrasive-free liquid preparation that removes the shine from clothing without injuring the fabric has just been made available to dry cleaners by the Vitatex Products Corporation of New York.

The fluid, sold under the trade name Killshine, works on the same principle as cold permanent wave lotions. When applied to the shiny area of a piece of material, its chemical action temporarily softens the tiny fibers which normally form the nap. These fibers, now pliable, are brought back to their original position by brushing. Thus the nap is restored and the shine killed.

On fabrics that have no nap, shine usually results from a flattening of the fibers that make up the material. Killshine temporarily softens these fibers and brushing restores them to their original shape, thus killing the shine.

Science News Letter, December 11, 1948

GEOLOGY

U. S. and British Atoll Borings To Be Compared

➤ HOW OLD is an atoll?

This still-vexed question may be brought closer to solution at the U. S. National Museum through the arrival in Washington of two tons of rock from the British Museum. The rock consists of cores cut by a hollow drill that bit 1,100 feet down into the substructure of the British-held atoll of Funafuti, a half-century ago. These cores will be compared with similar cuttings made since the war at Bikini atoll.

As of now, there seems to be a wide discrepancy between the ages of the two sets of rock samples. The Funafuti cores were estimated to be not more than 25,000 years old when they were first examined; those from Bikini have been assigned an age somewhere between 10,000,000 and 15,000,000 years. A re-examination of the British material may indicate that the first estimate on its age was too low. However, there seems to be considerable difference between the mineralogical makeup of the rock samples from the two atolls, which lie 1,500 miles apart in the Pacific.

Negotiations for the loan from the British Museum were conducted by Dr. John W. Wells, Cornell University geologist.

Science News Letter, December 11, 1948

ASTRONOMY

Astronomer Finds Fifth New Comet in Three Years

➤ A FIFTH new comet in three years is being credited to Michiel J. Bester, young astronomer at Harvard's South African station.

Mr. Bester's latest discovery is too far south to be seen by American observatories and too faint to be seen without binoculars or a telescope.

Tentative name for the new comet: Bester Five.

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AERONAUTICS

New Lighted Guide Path

Fliers will know when they are on the glide path in this slope-line system, as it is called, by the appearance of the lighting units.

See Front Cover

➤ A NEW lighted guide path known as the slope-line system, to lead in-coming pilots directly down to the end of a runway, has now been accepted by the highest federal aviation approval committee and is scheduled to become widely, if not universally, used at American commercial airports.

This slope-line system was developed by the Civil Aeronautics Administration, particularly by the late A. J. Sweet, and H. J. Cory Pearson and M. S. Gilbert. Already in use at the Indianapolis airport, where CAA's aviation experimental station is located, it will be installed very soon by CAA at eight other commercial landing fields. These are at Boston, Philadelphia, Nashville, Chicago, Houston, St. Louis, San Francisco and Seattle. Federal funds for these installations are now available.

This system in appearance differs from those generally in use. It is relatively simple. When first proposed, the idea was ridiculed as impractical, but it works, and is probably superior to any other known approach lighting scheme.

Other systems include two long rows of lights, often in V-shape with the apex at the landing end of the runway. This system is composed of a series of lighting units in V-shape but the lights in each unit are aligned at right angles with the approach path. And they disperse their beams forward in a wide angle, not vertically upward as other lights do.

An approaching pilot, if directly on the glide path, sees the lights as two almost continuous single lines, one to his right and one to his left. If not on the glide path, he sees broken lines arranged like the teeth on a saw. On the left side of the cover on this week's SCIENCE NEWS LETTER is shown the correct approach and on the right side the incorrect. This system not only provides him with two converging lines of light leading to the runway, but also gives him a glide path which he knows he is on by the appearance of the lighting units.

Each unit is made up of ten lamps in sealed-beam units similar to those used for headlights on automobiles. They are placed in an elongated box, 14 feet long, open to the front but not upward. The boxes and their lights are 100 feet apart, pointing inward, and at an angle of 4[illegible] degrees with the level earth. The glide path is the imaginary line connecting the intersection of these box-units with their opposite mates, if all were extended to meet like rafters on a roof over the center of the approach path.

If the lighting units were placed in parallel lines, this imaginary, apex-connecting line would be parallel to the ground. But they are not. At the outer end, they are perhaps 360 feet apart, and at the runway end, about 96 feet from each other, The result is that the imaginary line is much higher in the air at its outer extremity than near the runway. The lights must be so placed that the glide-path line approaches the landing strip at the proper slope for safe landing.

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QUINTUPLE SPEED OF SOUND ***—the wind tunnel shown above, in which the remarkable air speed of more than five times the velocity of sound was obtained recently, is a modernized captured German supersonic tunnel now at the Naval Ordnance Laboratory, White Oak, Md. The high speed, equivalent to 3,960 miles per hour at sea level at ordinary temperatures, was obtained under a temperature of 377 degrees below zero Fahrenheit, in a 16-by-16-inch working section of the tunnel. The achievment is a world record for tunnels this size.***

PALEONTOLOGY

Giant Ape-Man Fossils

➤ GIANTS as well as pygmies were among the weird population of ape-men who prowled South Africa's veldt in the dim geologic age before the emergence of man himself. Evidence for the existence there of a huge near-human being that was twice the size of a modern gorilla but much more man-like was reported to the University of California from one of the field parties of its African Expedition, by Dr. Robert Broom of the Transvaal Museum, who joined the University of California group last September.

Dr. Broom's find consists of the greater part of a lower jawbone containing three premolars and four molars, together with a separate lower wisdom-tooth, two upper incisors and one upper eye-tooth. All the teeth are gigantic, slightly larger than those of the giant Java man, Meganthropus. A man proportioned to match the dimensions of the teeth would have to be two and one-half times as big as an average human being and at least double the size of a present-day gorilla. Yet the teeth are definitely human in shape, not gorilline. In this they resemble the giant teeth from Asia.

Discovery of this race of giant ape-men comes on the heels of the announcement by Prof. Raymond A. Dart of Johannesburg that fossil remains of the creatures named *Australopithecus prometheus* represented a race of small, gracefully built ape-men weighing about a hundred pounds apiece, who knew the use of fire and of weapons and were in general much more human than they were first credited with being. (*See SNL*, Oct. 30).

The giant race will be known as Swartkrans Man, from the name of the cave where the jawbone and teeth were found. Age of the fossils is at present uncertain; estimates run from one-half million years to four million years.

Dr. Broom radioed to Wendell Phillips, leader of the University of California African Expedition who is now in Berkeley to report on the expedition's first 14 months of field operations: "On evidence to date, we can say that the new-type ape-man is larger than those previously known, that these ape-men are like man and were probably ancestral to him, and that they are not closely related to living apes."

Science News Letter, December 11, 1948

PHYSIOLOGY

Pins-And-Needles Feeling

➤ WHEN YOU FEEL "pins and needles" such as a foot or arm "going to sleep" after the blood supply to a nerve has been stopped and then restored, the number of pricks you feel and their intensity depend on the length of nerve recovering from the depressed blood supply.

Evidence for this view, which is contrary to those held by some other scientists, is reported by Dr. G. Gordon of Oxford University to the scientific journal, NATURE (Nov. 6).

The pins-and-needles sensation can be brought on by binding a cuff tightly around the arm, as a doctor does in taking blood pressure readings, and then releasing the cuff. Some scientists have thought the region of the nerve lying under the cuff was responsible for the sensation. Others held it was due to stimulation of a proportion of the outer nerve endings in the area in which the sensation is felt.

Dr. Gordon in his experiments produced the pins-and-needles sensation by putting a blood pressure cuff around the arm just above the elbow, thus cutting off the blood supply to the forearm and hand for 12 minutes, and then releasing the cuff. But when he blocked the nerve at the elbow, just below the cuff, by injecting the anesthetic procaine, the pins-and-needles sensation was not felt at all. This, he says, must mean that the four- or five-inch stretch of nerve lying under the cuff cannot be the place where all or even a majority of the pins and needles feelings start.

When the chemical block is applied to the ulnar nerve branches in the hand, so that the skin is numb to the feel of a real pin prick, the pins-and-needles pricks are fewer and less intense but still felt. This, Dr. Gordon points out, argues against the idea that the pins-and-needles feeling is due to stimulation of a proportion of the outer nerve endings, because the sensation is felt even when these nerves are blocked.

Blocking the nerve midway between the hand and the elbow causes the pins and needles to be far less intense than with a block in the hand.

From his experiments Dr. Gordon concludes that no part of a nerve is particularly concerned in generating the impulses that give rise to this form of pins and needles. The fact that the intensity and number of pricks are apparently due to the length of nerve recovering from lack of blood probably explains why the pricking of pins and needles is less intense when produced by a cuff at the wrist and very feeble indeed with a cuff around a finger.

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ENGINEERING-AERONAUTICS

Fuel Can Flow Steadily to All Engines in Plane Now

➤ FUEL will flow continuously and automatically from all tanks to all engines in a new flow system developed at Wright-Patterson Air Force base in Dayton, Ohio. The same system permits the refueling of all tanks on a plane from a single tank-truck.

It is an important life-saving and time-saving development. Many planes have crashed because existing fuel systems require pilots to switch tanks manually when the one being used is emptied. In this new system, fuel flows from all tanks to all engines without any action on the part of the crew. The fuel flows automatically by a system of pumps and valves until all tanks are empty.

The re-fueling feature of the new system is also important. The famous B-29, for example, has 29 fuel tanks with 11 servicing points. Using conventional methods, it takes 13 men with four trucks 45 minutes to refuel this bomber. With the new system it can be refueled by one man and one truck in 30 minutes. The operation is safe because there is no chance of gasoline spillage, and the job can be done with the engines running if desired. Capt. David Samiran is responsible for its development.

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Photographs: Cover, Civil Aeronautics Administration; p. 371, U. S. Navy; p. 373, Fremont Davis; p. 375, General Electric Co.; p. 379, Northrop Aircraft, Inc.

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AERONAUTICS

Airplane-Guidance Beams

Blanket of VHF radio beams will cover America soon from 409 transmitting stations. These omniranges will aid pilots in knowing their exact positions.

➤ AN INVISIBLE blanket of crisscrossing but distinct radio beams for airplane guidance will soon cover the entire United States. They will be the very high frequency type and will originate at 409 transmitting stations which the U. S. Civil Aeronautics Administration has just revealed it is erecting. With their aid, any pilot may know his exact position at any time.

In addition to these CAA stations, there will be others erected by the U. S. Air Force and the Navy. These two government agencies are planning on about 140 of them, but many will be outside the continental United States. Those at home will be at stations of the Armed Services not adequately served by the CAA system.

The air navigation system made possible by these new radio stations requires a new type of radio receiver in all planes. All types of commercial aircraft, and perhaps the majority of private planes, will be equipped with them by 1952, it is expected. Some of these very high frequency transmitting stations are already in use and commercial airliners are already provided with receivers. The new installation is to replace completely the older radio-guidance system which provided radio beams for pilots to follow, but provided only four courses.

This new type of radio range is called the omnirange. A more complete name is very high frequency (VHF) omni-directional range. It derives the title from the fact that each station sends out beams in all directions, or at least in 360 different directions one degree apart.

Being VHF, the beams are static-free and "line-of-sight" type. This latter means reception ordinarily requires a path between the transmitter and receiver uninterrupted by mountains and other obstructions. A plane in the air at high altitude can receive the transmitter signals at much greater distances than one near the ground.

Operating on the static-free VHF radio band, the system permits a pilot to fly by watching a vertical needle on his instrument board instead of listening to blurred and wearying sound signals. The omniranges present many other advantages. Pilots can fly a course either toward or away from an omnirange in any direction. This makes the ranges equally useful on or off an established airway. The system permits travelling across country instead of following beams, where this is desirable.

Distance-measuring equipment (DME for short) when used with the omnirange permits far simpler and safer air navigation than was possible with the old-type four-course radio range and marker beacons. When a pilot tunes his DME at an omnirange site, a pointer on its dial shows him in miles his exact distance to that station.

The combination of omnirange and DME gives the pilot a means of knowing his geographical position at all times. From his omnirange indicator he can read his course to or from the omnirange station, and from his DME dial he knows exactly where he is along the navigation line. The combination brings air navigation close to ultimate simplicity.

Omniranges and DME are designed to make flying high above clouds safe and sure. They are navigation aids, not landing instruments. However, they help bring a plane to the neighborhood of its destination where landing instruments take over and bring the plane down through overcast, sufficiently close to the runway to enable the pilot to make a visual landing. The well-known Instrument Landing System provides the plane with a glide path followed automatically by a properly equipped plane; and precision beam radar, better known as Ground Controlled Approach radar, provides the pilot with voice information as to whether or not his plane is exactly on the glide beam.

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BOTANY

Bracket Fungus Wanted

➤ MUSHROOM-HUNTING would seem to be over for the year, now that autumn has faded into winter. But it needn't be, if you've a mind to be helpful to a scientist who needs one kind of fungus and needs it badly. He is broadcasting an appeal over the land for it.

His name is Dr. Robert L. Frank, and he does his research in the William Albert Noyes Laboratory of the University of Illinois. He doesn't want mushrooms to eat. What he wants aren't exactly mushrooms, though they are closely related to mushrooms; they are one particular species of bracket fungi. They aren't fit to eat, not because they are poisonous but because they are so tough and woody that only a billy-goat could relish them.

One kind of bracket fungus, and only one, contains the thing that Dr. Frank is trying to get—a rare compound called polyporic acid, which he needs in his scholarly business. There isn't much of the acid to the ounce of the one-and-only bracket fungus that yields it at all, so he needs a lot of ounces. Hence the appeal.

The particular fungus needed belongs to the group known as the polypores, so called because their undersides are completely honeycombed with pin-sized pores or holes. The top surface is mainly smooth, though there may be some bumps and uneven spots. It is not divided into bands or zones, as many other bracket fungi are.

It is not a very big plant, as a rule; four inches long and three inches wide is about as big as it ever gets, and you may find specimens down to the size of your thumbnail. It is a thickish growth, with a definite bulge both above and below.

Color ranges from pale yellow to flesh-color or tawny copper. The whole body of the fungus has the same tint. When fresh, it is soft and fleshy, and is said to smell like anise. Even the dry specimens you will find in the woods now are likely to have a fragrance.

This species is to be found only on dead wood, usually of hickory, though also on poplar, maple, beach, some of the oaks, and a few other trees. It is easiest to hunt at this time of year, when the distractions of flowers and green leaves are out of the way.

In the botany books it is listed as *Polyporus nidulans*. A while back, it had its name changed so that you may find it listed in some of the older reference books

SOURCE OF ACID—This is what the sought-for bracket fungus looks like, viewed from beneath. The crucial test is to moisten it with a drop of ammonia. If it turns purple, you've got it.

as *Polyporus rutilans*.

There are a number of polypore species, some of which are much more abundant than this, which is the only one that is of any use to Dr. Frank. So it is important to get a proper identification on a specimen that might be it.

The crucial test, says Dr. Frank, is quite simple: moisten your specimen with a drop of ordinary household ammonia. If it turns purple, you have the right species.

Dr. Frank says he will welcome anything from a single specimen up to several pounds, and will gladly refund shipping charges.

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CHEMISTRY

New Plastic Insulator

➤ A NEW high-temperature, transparent plastic, that can be tempered somewhat as metals are hardened, is now in limited commercial production.

Made up of fluorine and chlorine to the extent of four-fifths of its weight, it is related to the new family of organic compounds, the fluorocarbons, which reached practical development during the war. Chemically it is trifluorochloroethylene.

Produced by M. W. Kellogg Co., of Jersey City, N. J., it came out of the laboratory of Dr. W. T. Miller of Cornell University.

Extremely resistant to chemical action, even to concentrated sulfuric, hydrofluoric and hydrochloric acids, it is nevertheless easily worked into shape. Although strong and hard, it is not brittle. Although suited to use at as high as 390 degrees Fahrenheit, it is also very satisfactory at very low temperatures, even at the cold of liquid nitrogen, 320 degrees Fahrenheit below zero. It is a good insulator for electricity and heat, and water rolls off it like the proverbial duck's back.

Because it withstands weather so well, it is likely to be used in instruments, airplane and ship parts, railroad signals and electrical insulation that get hard outdoors usage. It can substitute for glass in laboratories and chemical plants and handle corrosive gases and liquids.

It will be used at low temperatures and for electrical insulation in corrosive or humid conditions. Because it is not wetted by water or humid atmosphere, one use will be to avoid electrical short circuits due to water film condensation.

Because the new plastic, called commercially Kel-F, can be treated or tempered very much as though it were steel, it can be tailored or processed for use at a predetermined temperature.

Comparing the trifluorochloroethylene chemical structure of the new plastic with its fluorocarbon cousins, some of the fluorine is replaced by chlorine. Fluorocarbons are similar to familiar hydrocarbons of petroleum, but all of their hydrogen is replaced by fluorine, making fluorocarbons more inert.

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MEDICINE

Stomach Cancer Detection

➤ HOPE of saving the estimated 40,000 fatal stomach cancer victims in the United States each year by mass X-ray surveys was knocked down with the words "impractical" and "impossible" in a report by two Mayo Clinic radiologists to the AMERICAN JOURNAL OF ROENTGENOLOGY AND RADIUM THERAPY (Nov.).

The radiologists making the gloomy report are Drs. B. R. Kirklin and John R. Hodgson. They stated:

"It would take 1,917.6 roentgenologists examining a stomach every two minutes for eight hours steadily every day of the year, including Sundays and holidays, year after year continuously, to make a satisfactory survey of this group of people (all those over 40 years old) every three months."

All persons over 40 years would have to be examined, they explained, because they estimate that 95% of all the stomach cancers occur in persons in that above-40 age group. This group makes up about 30% of our population.

The survey must be made on each person in the group every three months, they stated, because stomach cancer can develop within that time. If done less often, the purpose for which the examinations are made, detection of the cancer in time to save the patient, will be defeated, they stated.

"We believe that one of the most important parts of the campaign against cancer is the continued education of the public to an awareness of cancer," they stated. "We believe that this should be augmented and that this alone will bring many patients to the physician in time. In any event the public must be educated before any attempt to survey is tried. They should especially know why they have to be examined every three months."

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MEDICINE

Ringworm Rated Most Common Skin Disease

➤ RINGWORM, the fungus infection of the scalp and body, is probably the commonest skin disease today, Dr. Everett C. Fox of Dallas reported to the American Medical Association meeting in St. Louis.

He based his report on records of more than a million cases.

Eczema and acne also rate high on his list of the 10 most frequent skin diseases. The other seven on the itchy list are:

1. seborrhea, a scaly skin disease caused by excessive discharge from certain skin glands; 2. contact dermatitis, caused by irritation of the skin from various chemicals or animal or plant life; 3. impetigo, the superficial infection caused by streptococcus or staphylococcus germs; 4. scabies, commonly known as the itch; 5. nettle rash, or hives; 6. psoriasis, a chronic inflammatory skin disease characterized by patches covered with white scales; 7. pityriasis rosea, an inflammatory disease marked by reddish spots and ring-shaped patches upon the body.

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ZOOLOGY

Beaching of Pilot Whales Still a Zoological Riddle

➤ ZOOLOGISTS have never been able to find the reason for the suicidal "follow-the-leader" tactics of the pilot whale or blackfish, which caused a school of 44 of them to beach themselves near St. Augustine, Fla. This peculiar behavior is shared by a related species, the false killer whale, stated Dr. Remington Kellogg of the U. S. National Museum.

There used to be a small rendering plant on Nantucket, to salvage the carcasses of pilot-whale schools coming ashore on the North Atlantic coast. Its owner, Howard Wardell, would send a fleet of trucks to pick up the luckless little whales. This plant has now closed down, due to scarcity of raw material.

Scottish fishermen on the Orkney islands, and Danes on the Faroes, still take advantage of these chance harvests, and even help to drive the animals ashore by pounding on cans and tubs held in the water.

Beached whales do not die as fish die. They are air-breathing mammals, depending on lungs, not gills. However, when their bulky bodies are not buoyed up in the water, their own weight crushes them down, making them unable to breathe. So they die of suffocation, as a man might if he lay on the ground with a heavy weight on his chest.

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The first American *automobile* powered with gasoline was the Duryea car built in Springfield, Mass., in 1893.

METEOROLOGY

Rain-Making Ineffective

Extensive nine-month program of tests revealed that dry-ice seeding will not produce enough precipitation to be economically significant.

➤ NO ONE yet has done anything about the weather. Newest scientific support for this comes in the report of scientists who conducted an extensive nine-month program of tests to find out if the highly publicized dry-ice seeding could be used to make clouds rain or snow. Scientists of the U. S. Weather Bureau have concluded that this system will not produce enough precipitation to be useful.

To give the plan a thorough test, the Weather Bureau and the U. S. Air Force set up a 160-square-mile testing ground near the Clinton County Air Force Base, Wilmington, Ohio. Five Air Force planes, 55 ground weather stations and extensive radar equipment were used in the cloud-seeding operations in Ohio.

After nearly nine months of experiments, the Weather Bureau scientists concluded:

1. Not enough precipitation is produced to be economically significant.
2. Very little rain was produced unless there was natural rain within 30 miles.
3. No rain was produced except when there was natural rain falling within 40 to 60 miles.

Heading the scientific phases of the Cloud Physics Project was Dr. Ross Gunn of the physical research division of the Weather Bureau. The partial scientific report of the project was prepared by Dr. Gunn, Richard D. Coons and Earl L. Jones. Air Force operations were conducted by the All-Weather Flying Division, with Capt. Homer C. Boles in charge.

Not only did the experiments fail to produce significant amounts of rain, but the experiments showed that the seeded portions of billowy cumulus clouds might be dissipated by the seeding. This was observed in 10 of the 79 tests conducted.

Radar equipment aided in control of aircraft movements and in determining in what area rain actually fell and whether the rain was natural or induced by the seedings.

In addition to the best known dry ice method, water and chemical agents such as lead oxide and silver iodide were used.

Two series of experiments were made. In the first, winter layer clouds were seeded between Jan. 9 and May 1. A total of 38 operations failed to produce any precipitation unless rain was falling within 30 miles.

A series of 79 full-scale tests on cumulus clouds, conducted between March 18 and Sept. 8, produced rain in 18 clouds. But only five of the clouds produced rain when there was no natural rain within 30 miles. In all of these five cases, natural rain was present within 40 to 60 miles.

The total of 117 experiments indicated that appreciable amounts of snow or rain are produced only when large masses of moist air are brought into an area by systems of winds that somehow produced large-scale cooling. This is the way natural precipitation is produced. Cloud seeding techniques, the study indicates, will provide no useful short cuts for relieving droughts, fighting forest fires or any of the other proposals suggested in the past two years.

Science News Letter, December 11, 1948

ENGINEERING

Tiny Cracks Grow to Large Splits When Metals Break

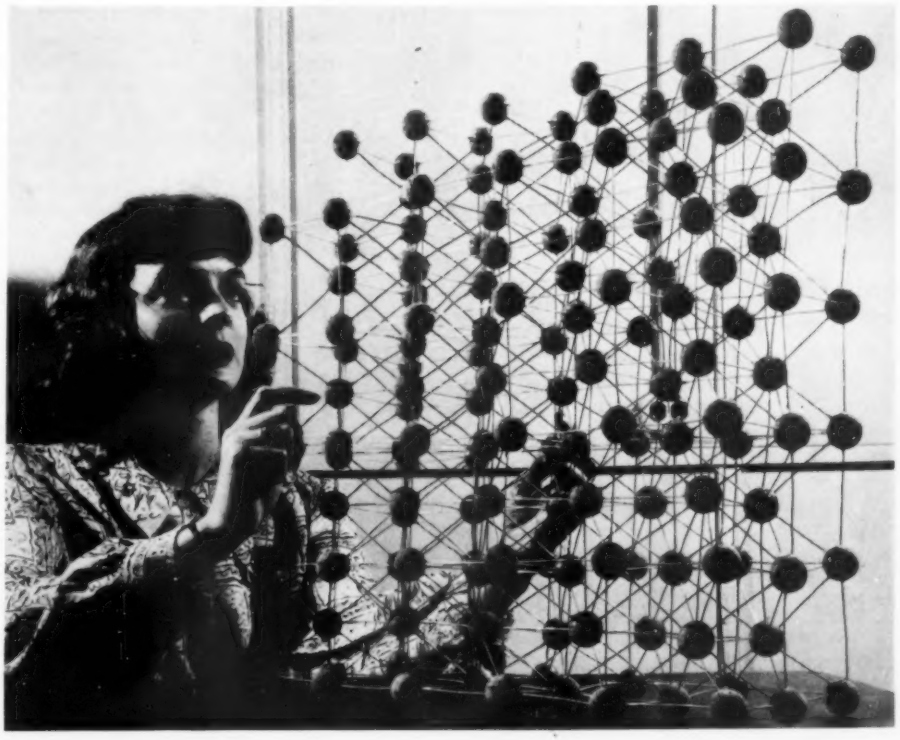
➤ WHEN METALS break, the fractures begin with extremely small cracks, investigations by General Electric scientists show. The break does not occur instantaneously throughout the sample, as usually assumed. The tiny cracks are the nuclei which grow into a large split when enough tension is applied.

Bubbles that break a column of water have much in common with the tiny cracks in metal. Therefore, the metal studies began with research into how a column of a fluid breaks. The giant redwoods of California give a good example of how much tension a fluid can stand without breaking, the GE scientists said.

The larger redwoods pull columns of water in their trunks as high as 300 feet above the ground, under a tension of about 130 pounds per square inch. Water under such low pressure would be expected to boil. If this were to occur in a tree, the column of sap would be broken, and the tree would die. The redwoods survive because there are no nuclei of the critical size for the 130-pound tension exerted on the sap. Before the boiling process in fluids or the breaking process in metals can take place, there must be nuclei, the scientists stated.

The smaller the nucleus in a fluid column or in a metal, the bigger the force needed to expand it into a break. For every tension there is a critical bubble or crack size. If, when a certain tension is applied, there are nuclei of the critical size or larger, they will grow rapidly, causing the sample to break.

Science News Letter, December 11, 1948



MODEL IRON CRYSTAL—It is along the boundaries of such grains as shown in the model that tiny nuclei cracking spaces occur.

PHYSICS

Photograph Birth of Meson 13 Miles Above Earth

➤ CAPTURING at 13 miles above the earth's surface a picture of a powerful cosmic ray particle giving birth to a meson, fundamental bit of matter still largely unexplored, is hailed as an aid to finding new kinds of atomic energy.

Dr. Marcel Schein and J. J. Lord of the University of Chicago's Institute of Nuclear Physics reported their unique balloon flight photograph to the American Physical Society.

The particle from outer space rushed along with an energy of 20,000,000,000 electron volts and the production of the meson hardly affected the plunge earthward. There was no explosion when the meson was let loose, although usually there is normally star-shaped evidence of a great smash-up when a meson is detected in cosmic rays.

No man-made atom smasher is in the billion electron volt range yet, although two machines with ranges of from three to seven billion electron volts have been financed for completion in three to five years and artificial mesons have been made in the 400,000,000 electron volt cyclotron at Berkeley, Calif.

New hints of atomic energy may come from cosmic ray studies with photographic plates sent aloft in free-flying balloons to heights where the rays are powerful. The studies with nature's own atom smashers may point the way to some new atomic reactions that will release energy.

New transformations of fundamental particles that would yield potent projectiles are quite possible, as Dr. Cecil B. Ellis of the Office of Naval Research told the physicists, discussing new sources of atomic power.

Science News Letter, December 11, 1948

MEDICINE

Fall Over Tricycle May "Crack" Child's Kidney

➤ MANY a small child has had a "cracked kidney" from a fall over the handle bars of a tricycle or from a kick in the course of his play with other youngsters, Dr. Cyrus E. Burford of St. Louis warned at the meeting of the American Medical Association in this city.

The child may not complain much at the time but later will need an operation to save his life.

Children and athletes, he said, are vulnerable to serious kidney disease.

"Boxers and wrestlers receiving kidney punches bleed from bruised kidneys, and many develop kidney stones eventually," he said.

"Streptococcus throat infections in children not infrequently cause kidney disease, many cases of which may be cured if recognized, managed, and treated by a physician."

Blood in the urine may be the only early symptom of cancer or kidney stones, Dr. Burford emphasized.

"Of importance is the seeming increase of tumors of the kidney and bladder first indicated by the appearance of blood in the urine. These are usually painless, and failure to diagnose the condition in the early stages denies the patient his chance for a cure," he said.

"Perhaps our greatest concern should be with young children who do not describe particular symptoms but whose urine may lead us to a diagnosis of Wilms' tumor of the kidney, one of the most malignant and rapidly growing tumors known, occurring almost exclusively in children under 11 years of age and which may be cured by surgery if discovered early.

"Silent stones in the urinary tract may cause blood in the urine as their only symptom until the kidney is damaged beyond recovery.

"Blood in the urine should always be given careful consideration, and if not readily explained deserves a complete urological examination to determine the source and cause."

Science News Letter, December 11, 1948

AERONAUTICS

Pilotless Planes Make Record Controlled Flights

➤ THE LONGEST controlled flights ever made with pilotless aircraft powered with ram-jet engines were revealed by the U. S. Navy at its Air Missile Testing Center, Point Mugu, Calif. Several flights under radio control of more than 10 minutes were made.

The plane used was the Gorgon IV, officially the PTV-N-2, a high-winged monoplane 22 feet long, 10-foot wingspan, and almost no tail. It was purposely designed under Navy direction to operate at subsonic velocities. It was built by the Glenn L. Martin Company of Baltimore and powered by a ram-jet made by Marquardt Aircraft of Venice, Calif.

The ram-jet on this plane, seven feet long and 20 inches in diameter, is suspended below the fuselage well toward the rear. Because the ram-jet engine can not operate until it has sufficient speed to scoop up enough air for the combustion of its fuel, the plane in the tests was taken aloft by a U. S. Air Force Black Widow fighter from which it was released to obtain speed by gliding.

In flight, the plane was tracked by ground-based radar and maneuvered by ground-based radio control. It was completely instrumented to telemeter to a ground receiving station such data as speed, altitude, brake drag, controllability and engine operation.

Science News Letter, December 11, 1948

IN SCIEN

ENGINEERING

Warmer Color Is Added to Mercury Vapor Lighting

➤ HEALTHY MEN working under mercury vapor lights need no longer look pale and sickly, and women's lips may appear their natural or applied color. A fluorescent material, developed by a Westinghouse scientist, makes the light from the mercury vapor tube eight times richer in red than from the tubes of clear glass, and people under it look natural.

The material is a high-temperature phosphor, which is used to powder the inner glass wall of a mercury vapor lamp. This fluorescent coating transforms the invisible ultraviolet rays into pure red light which, added to the bluish-white light from the mercury vapor, gives illumination under which persons and objects appear more nearly in their true colors.

The discovery of the phosphor which transforms the invisible radiation into visible red light and at the same time withstands the high heat within the tube, was made by Luke Thorington of the Westinghouse lamp division staff. This temperature is in the neighborhood of 750 degrees Fahrenheit. The phosphor absorbs some of the light normally given off from the mercury vapor but the invisible ultraviolet converted into visible radiation more than offsets the loss.

When the first mercury vapor lamps were introduced in 1901, they produced a cold blue light which blackened red lips and distorted color values generally. Later they were improved by boosting the pressure of the mercury arc inside the tube. Still later, cadmium and zinc were added to the lamp itself. These devices cut overall lighting efficiencies. The new phosphor does not.

Science News Letter, December 11, 1948

PUBLIC HEALTH

Plastic Spoons Help Army Fight Disease

➤ PLASTIC SPOONS are the Army's newest weapon against disease.

A new C ration (Ration, individual, Combat, C-4), announced by the Department of the Army will have plastic spoons. The spoons are sterilized, sealed in cellophane wrappers and are to be thrown away after one meal. This is designed to combat dysentery, which sometimes has resulted from the use of utensils by troops with no facilities for cleaning them.

Science News Letter, December 11, 1948

E FIELDS

MEDICINE

Streptomycin Mold Yields Vitamin B_{12}, Group Finds

➤ ONE of the newest vitamins, B_{12}, for pernicious anemia, can be obtained from the same species of mold that produces another important modern remedy, streptomycin, a five-man research team at Merck and Co., Rahway, N. J., have discovered.

The five are Edward L. Rickes, Frank R. Koniuszy, Norman G. Brink, Thomas R. Wood and Karl Folkers who last April first reported isolation of this vitamin from liver. They report their latest discovery in the journal, SCIENCE (Dec. 3).

The red crystals they have now obtained by fermentation from the mold, *Streptomyces griseus,* have the same beneficial effect in pernicious anemia as the vitamin B_{12} from liver, Dr. Randolph West of Columbia University's department of medicine found.

The discovery is "an important stride forward from having to work up huge quantities of liver" to obtain the vitamin, George W. Merck, president of Merck and Co., pointed out. He hopes that the new vitamin can be made commercially available soon, although the extensive work now under way has not yet reached the stage, he said, where promises on commercial availability can yet be made.

Science News Letter, December 11, 1948

ENGINEERING

Reflective Radiant System Will Feature New Home

➤ REFLECTIVE radiant conditioning, not the relatively new radiant heating system, will be employed to keep a house to be constructed in Cincinnati comfortable in summer and winter, the University of Cincinnati revealed.

The house when completed will contain none of the conventional furnaces, air-conditioning units and insulation. Walls and ceiling surfaces are to be of embossed aluminum foil, one of the best heat-ray reflectors known. In place of heating plant there will be a few electrical resistance coils in each room for generating heat rays.

Cooling coils, resistance wires for heat, and fluorescent color lighting will all be placed in a cove near the ceiling, giving heat and light and removing radiant heat in hot weather only by indirection. The scheme, according to the university, is to heat and cool through radiant channels almost exclusively, with little or no concern for air temperatures or humidity.

This system for maintaining year-round indoor comfort is credited to Dr. Clarence A. Mills, of the university's medical college. He proved it to be workable 10 years ago under laboratory conditions. Now it is to be tested in an actual house, and the house is to be the residence of the physician.

In his laboratory work, Dr. Mills demonstrated that complete human comfort can be achieved by controlling heat loss from the skin through radiant channels alone. Thus an individual, he states, can be made equally comfortable at 100 degrees Fahrenheit or at zero by proper attention to the net rate of heat loss from the body.

"Let him lose heat freely by radiation from his body to a cold object, such as a wall surface, and he can disregard the hot air next to his skin," Dr. Mills declared. "Under such conditions his skin becomes distinctly cooler than the air next to it."

"And in colder air he is comfortable if his skin is kept warm by adequate rays from a radiant object, again such as a wall surface. Under this radiant system, wall and ceiling surfaces act as passive reflectors of heat rays, while their actual temperatures remain the same as those of the air mass next to them. Thus there is no longer any concern over heat flow through walls or ceiling and no further need for insulation."

Science News Letter, December 11, 1948

GENERAL SCIENCE

World Campaign for Literacy Expected

➤ A WORLD CAMPAIGN to be sure that everybody can read and write is likely now that Mexico's great teacher of literacy heads the United Nations Educational, Scientific and Cultural Organization.

Jaime Torres Bodet, who has just resigned as minister of foreign affairs of Mexico, recalls the successful "alphabetismo" program which he conducted in Mexico while he was minister of education. More than one million Mexicans learned to read and write as a result of this campaign for which only two million pesos (or about $400,000) was spent. This was a cost of only about 30 cents per person.

Key method in the Mexican fight against illiteracy was a good neighbor process of having each literate person teach someone who had not had educational advantages. Thus, the lady of the house might be school marm to her cook and the head of a business concern might be the professor of reading and writing of a laborer in his employ.

Sr. Torres Bodet expressed the hope that UNESCO could be operated within the budget set up for it and that the many countries contributing to UNESCO will feel that they get a full measure of return for their financial and cultural support.

Science News Letter, December 11, 1948

PHYSICS

New Kind of Oxygen Has Been Created

➤ A NEW KIND of oxygen has been manufactured and discovered.

A Princeton University team of scientists, Drs. R. Sherr, H. R. Muether and M. G. White, reported to the American Physical Society meeting in Chicago that by flinging the hearts of hydrogen atoms into nitrogen compounds it is possible to create a very short-lived variety of oxygen.

This is the sixth isotope of oxygen to be known. It is oxygen 14, which makes it just the same atomic weight as the commonest sort of nitrogen. Both positrons (positive electrons) and gamma radiation are involved in the decay of the new kind of oxygen, which exists only about 76 seconds before it turns into an excited sort of nitrogen.

The other sorts of oxygen weigh 15, 16, 17, 18, and 19 times that of hydrogen, lightest of the elements, and oxygen 16 is the commonest sort in the air we breathe. Nitrogen 14 is also in the air.

Science News Letter, December 11, 1948

ENGINEERING

Ice in Continuous Column Extruded by New Ice-Maker

➤ HARD white ice in a continuous column comes out of a new ice-making machine described in New York to the American Society of Mechanical Engineers by Prof. John R. Watt of the University of Texas. The machine utilizes no brine, ice cans or labor.

Mr. Watt, who developed the process, explained that in his scheme a method of freezing the water from the inside outward is followed. In conventional ice-making the outside is frozen first. In his method, after the center core is formed successive layers are added around it to bring the whole to a proper size. It is like the growth of a snowball rolling down hill, he said.

Basically, the machine developed by Mr. Watts in his preliminary work was composed of a tank of water in which a doubled-wall tapered freezing cylinder was mounted big end up. A perforated ram at the bottom worked up and down in the lower end of the cylinder.

With the ram in low position and the machine filled with water, an ice core was frozen low down in the tapered chamber. When this was solid the ram lifted it about an eighth of an inch where a thin layer of water surrounded it. When this water was frozen, the ram and new core below raised it higher. With the process continued, the result is a column of ice built up of successive layers, visible to the eye but permanently bonded together.

Science News Letter, December 11, 1948

AERONAUTICS

Speedier Planes Foreseen

Jets and rockets have revolutionized flying since the Wright brothers' first hop 45 years ago. More speed and greater safety are forecast for the future.

By A. C. MONAHAN

➤ PARIS in an hour? Week-end trips to the moon? Routine travel faster than sound? Anywhere on the earth just across the airstrip?

Now aviation is two-score and five years old. Now the Wright brother's biplane, famous for its world's first 852-foot hop at Kitty Hawk, N. C., on Dec. 17, 1903, is back home in the Smithsonian Institution as one of the great national relics. Now jets and rockets streak the air with supersonic speed. Giant 100-passenger transports cruise above oceans and continents.

What's ahead? What will the intensive research of a hundred laboratories hatch for the air future? Here's what the experts dare to expect.

Planes of tomorrow may bear little resemblance to those of today. New power plants, new sleek design lines to meet the requirements of supersonic speed, and new air knowledge, may make them obsolete long before the end of the second 45-year period. What future airplanes will look like is only a matter of speculation.

Designed for Speed

Future planes designed for fast speed will perhaps be long and narrow, with lance-like noses to penetrate the air and bodies tapering to the rear, and with short but broad square-tipped wings whose forward edges will be sharp like knife blades. But, on the other hand, they may follow the design of the flying wing, a type of ship in which the entire surface contributes to lift, and drag is at a minimum.

What 1993 air travel will be is only a guess, but what the next few years will bring is more certain. Bigger planes may be built, but that is not particularly important. Economics, not mechanics, will probably be the determining factor. Greater speed seems to be a popular demand. Faster planes of the present types are certain as jet-propulsion replaces the conventional whirling blade propellers driven by ordinary engines.

In the relatively near future, transcontinental and transoceanic scheduled transports may have speeds approaching that of sound, approximately 760 miles at sea level. Improved jet engines will be responsible. It must be remembered that jet-propulsion is still in its infancy. It is only six years since the first American-built jet plane made a successful flight. England had beaten us by over a year in this development, Germany perhaps even more. The engine in America's first jet plane was the British-developed type. Now America has several advanced jet engines of its own, and new types in the making.

Rocket ships have been proclaimed in popular literature as a possible conqueror of interplanetary space. Rockets are already playing an important part in aviation, but too much must not be expected of them in ordinary transportation. The duration of rocket-powered flight will always be short if the vehicle is subject to return to the earth through its gravitational influence, an aviation expert recently stated. This is due to the weight of the oxygen that must be carried in addition to the weight of the fuel.

The range of rocket-powered flight, he added, is theoretically very great in certain types. After leaving the earth's heavy blanket of atmosphere, the velocity of the rocket may be stepped to over ten times the values practicable in the lower atmosphere.

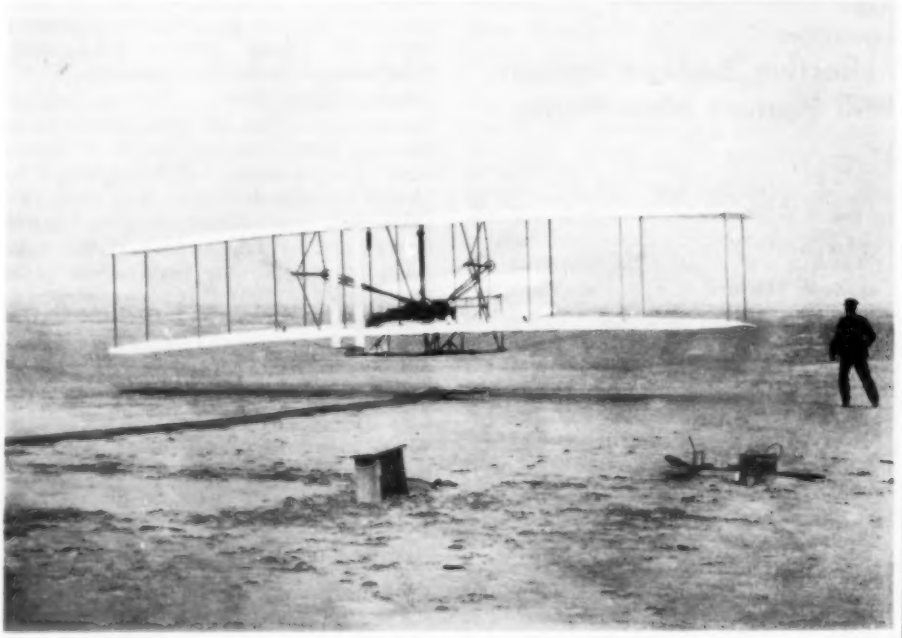
Present uses of rockets in aviation are principally as take-off assists to help get heavily loaded planes into the air, and as supplementary power to give spurts to planes in the air in emergencies such as might be encountered by a fighter in combat. Some day, they may be applied to craft designed to travel at very high altitudes to take them swiftly along the part of the course too high for other engines to operate.

Rocket engines are the only types now known which can be used where there is too little air to provide oxygen for combustion, a requirement in all other present engines. Rockets carry their own oxygen, usually in an oxygen-yielding chemical mixed in the fuel. Liquid oxygen is also used, particularly with liquid fuels.

Atom-Powered Planes

Atomic power is a possibility for airplane propulsion in the future. Some engineers seem to think that it would be a comparatively simple matter to utilize the heat generated by the fission of atoms in the combustion chamber of a gas turbine. First, however, man will have to learn how to apply atomic energy to stationary equipment, and how to take care of the radio-activity and poisonous byproducts that are developed.

The ram-jet engine is also for auxiliary power, or for total power after a plane has reached a high speed. It can not be used as a take-off assist because it operates only after it has acquired sufficient speed



AVIATION'S HUMBLE ORIGIN—This is the original Wright plane which is famous for its world's first 852-foot hop at Kitty Hawk, N. C.

45 YEARS OF PROGRESS—This U. S. Air Force Northrop Flying Wing eight-engined, jet propelled bomber is one of the achievements of modern technology.

to be able to scoop up enough air for combustion. It is useless above the atmosphere because it depends upon air for its oxygen. But where it can be used, it is one of the most efficient power plants yet developed.

Ram-jet engines are of very simple construction. They are metal tubes open at both ends which scoop up sufficient air at speeds of some 300 miles per hour to unite with fuel in a combustion chamber. The gases of combustion are discharged at high pressure to the rear to cause propulsion. Its outstanding features are its high power per unit frontal area, and per unit weight, its high specific impulse as compared to rockets, and its mechanical simplicity.

Pilotless airplanes, controlled by radio, have already successfully flown many thousands of miles in company with control planes, separated by miles, from which the controls were handled. They take off and land under remote control. It will be remembered that pilotless planes, carrying photographic equipment, flew through the air over the atomic bomb tests at Bikini. Their mothership flew safely to one side of the explosion area. Guided missiles, widely mentioned, are controlled in about the same way, using usually ground-based radio-radar stations.

Pilotless planes are not likely to be used in the near future to carry civilian passengers. They might some day be used for mail and express. A plane equipped with jet engines for take-off and landing, with rocket or ram-jet power in flight, might cross the Atlantic in a few hours. Control stations would be located on land or on anchored vessels or floating rafts between Newfoundland and Ireland.

Speed with Safety

Supersonic speeds without safety would have little value in commercial air transportation. But static-free very high frequency radio communication between aircraft and ground stations is already in use and vastly improved equipment is promised. Radio ranges, whose beams pilots follow, are also using very high frequency waves. They are an important safety factor, enabling a pilot to fly even under bad weather conditions.

Important also are the improved instrument landing equipments which enable a pilot to bring his ship safely to the airfield even when the runway can not be seen until down to within a hundred feet of it. Radar, radio, and approach and runway lights which can be seen a thousand feet through dense fog, all play important parts. The ground-controlled approach system, developed during the war to bring military craft safely in by means of radar and radio, has assisted many thousands of planes to runways. It is but about five

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years old. Already greatly improved, it is a system from which much may be expected in the future.

Within the next decade or so, greatly increased speeds in civilian transportation by air may be expected. Turbo-jet, ram-jet and rocket engines will be responsible. The so-called unbreakable sonic barrier, related to the elasticity of air which limits the speed of sound, has already been broken. New designs to permit fast traveling and to withstand the air shock waves encountered may alter the general appearances of supersonic planes. And along with these developments the "everyman's" helicopter may be simplified and become a familiar sight in millions of backyards.

Science News Letter, December 11, 1948

GENERAL SCIENCE

Young Scientists Compete

Eighth Annual Science Talent Search is under way this month with 16,000 boys and girls competing for the $11,000 in Westinghouse Science Scholarships.

➤ TEEN-AGE scientists all over the United States are sitting down for some pre-Christmas writing.

Their three-hour composition will be no letter to Santa Claus but it will bring 40 of them the best Christmas present they ever had—an invitation to the five-day Science Talent Institute in Washington and a chance to win a Westinghouse Science Scholarship.

Some 16,000 boys and girls began to take, on Dec. 1, a three-hour science aptitude examination in their own public, private and parochial schools as the first step in the competition for the $11,000 in Westinghouse Science Scholarships offered in the Eighth Annual Science Talent Search, conducted by Science Clubs of America, administered by Science Service.

The high school seniors, all of whom aspire to careers in science, will also submit scholastic and other recommendations and a 1,000-word essay on the subject, "My Scientific Project" before the competition closes at midnight, Dec. 27.

Judges to Name 40 Winners

The science aptitude examination, designed each year by Drs. Harold A. Edgerton and Steuart H. Britt, New York psychologists, is planned to reveal ability to think and reason rather than to measure acquired knowledge of science.

Only 40 boys and girls will be invited to the Eighth Annual Science Talent Institute March 3 through 7, 1949. For five days they will learn about new developments in science, listen to and talk with prominent scientists and be introduced to possibilities for their future in scientific research.

During their five-day all-expense stay in Washington one of the young scientists will receive the $2,800 Westinghouse Grand Science Scholarship. Runners-up will receive scholarships ranging from $100 to $2,000. The $11,000 in scholarships will be awarded at the discretion of the judges: Drs. Edgerton and Britt; Dr. Harlow Shapley, director, Harvard College Observatory; and Dr. Rex E. Buxton, Washington psychiatrist.

Honorable Mention For 260

The judges will name 260 other entrants in the Science Talent Search for Honorable Mention and Science Clubs of America will assist them as well as the 40 winners in getting scholarships at the colleges, universities and technical schools of their choice. Previous Honorable Mentions have received valuable scholarships and other financial assistance in this way to continue their education.

Entry materials and full details of the Eighth Annual Science Talent Search can be obtained by writing to Science Service or direct to Science Clubs of America, 1719 N St., N. W., Washington 6, D .C.

Science News Letter, December 11, 1948

GENERAL SCIENCE

Adjustable Laboratory Featured in New Building

➤ LABORATORY SPACE tailored to fit the needs of individual experiments can be arranged in the $8,000,000 first section of General Electric's new research laboratories near Schenectady, N. Y., which has just been dedicated.

Standardized steel partitions in the building can be set up or taken down in a few hours to create different room sizes. Pipes and conduits in the laboratory will supply the researchers with direct and alternating electrical current of various voltages, city water, distilled water, illuminating gas, oxygen, hydrogen, nitrogen, compressed air, vacuum and steam.

Science News Letter, December 11, 1948

CHEMISTRY

New Synthetic Detergents Have Advantages Over Soap

➤ ONE POUND of synthetic detergents is now sold for every five pounds of soap, and these newer cleansing agents boast several advantages, the American Oil Chemists' Society meeting was told in New York.

Foster Dee Snell of Foster Dee Snell, Inc., said that the synthetics usually work better in hard water than in soft. On the other hand, more than half of the soap used in your household probably goes to soften the water so that the rest of the soap can do its work. Development of synthetic detergents also may help the world food situation, he added. Soaps are made from fats and oils, while many of the detergents are made from petroleum.

Science News Letter, December 11, 1948

Hydrazine hydrate is an important ingredient in some rocket fuels.

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Stock No. 5102 Q—7x50 Optics—**$25.00 Postpaid. NOTICE:** Add 20 percent Federal Excise Tax to your remittance if you buy both the Binocular Optics and Metal Parts.

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COMPLETE OPTICS & METAL PARTS—Model M-13A1, 6 x 30 Binoculars (Waterproof Model). Everything you need—ready for assembly. When finished will look like a regular factory job costing $102 to $120. The Optics are new, in perfect or near-perfect condition. Have new low reflection coating. Metal parts are new and perfect, all completely finished. No machining required. Complete assembly instructions included.

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METAL PARTS ONLY—Model M-13A1, 6x30 Binoculars. No Optics. Same Metal Parts as described for Stock No. 830-Q.

Stock No. 832-Q—6 x 30 Metal Parts ..... **$25.00 Postpaid**

OPTICS FOR 6 x 30 BINOCULARS (No Metal Parts.) Perfect and low reflection coated.

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If you buy both the Binocular Optics and the Binocular Metal Parts, your purchase becomes subject to 20% Federal Excise Tax. Be sure to add amount covering tax to your remittance or your order cannot be filled.

OPTICS AND METAL PARTS are available for Monoculars (½ a Binocular). For complete details, write for Bulletin Q.

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MOUNTED ANASTIGMAT LENSES—Use for Projectors, Enlargers, Copying Cameras. Complete with Shutter and Diaphragm. Value about $20. These were made for a specific camera but had longer or shorter focal length than could be used, and then the camera was discontinued. An excellent buy. WE WILL INCLUDE FREE ILLUSTRATED BOOKLET on HOW TO MAKE YOUR OWN ENLARGER.

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6 POWER PERISCOPE and **ADJUSTABLE TRIPOD.** 27" long. Focusing eye-piece. Adjustable cover for objective end. Govt. cost $150. Tripod and mount worth more than purchase price.

Stock No. 717-Q ..... **$20.00 f.o.b. Audubon**

NEW 50-PAGE IDEA BOOK "FUN WITH CHIPPED EDGE LENSES"

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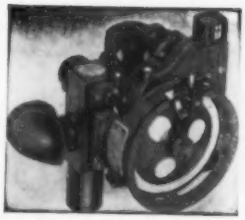

These Army Air Forces Bubble Sextants costs the Govt. about $125.00 each. A real bargain at our price at $12.50! Wooden carrying case included. Also auxiliary items. Wartime used. **BUT COMPLETELY REPAIRED COLLIMATED AND PUT IN GOOD WORKING ORDER.** If not satisfied that Sextant is exactly as represented, return within 10 days for refund. Full directions for use accompany each shipment.

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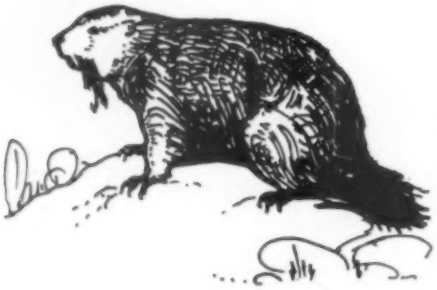
ZOOLOGY

NATURE RAMBLINGS

by Frank Thone



Gathering into Barns

➤ AT HARVEST time, we are apt to become a bit satisfied with ourselves, regarding man as the only creature that looks toward the future and seeks security against its chances by laying in supplies. Yet a moment's looking about will dispel this mistaken pride, for the world is full of other beings that also gather into barns.

Rodents as a class offer numerous interesting examples of this hoarding habit. Squirrels lay up stores of nuts and grain, beavers stock their ponds with sticks bearing tasty bark, certain wild mice lay by quantities of seeds, and the pika or little chief hare of the Rocky Mountains cures hay and packs it away in his rock-crevice home.

Birds are not often thought of as hoarders; indeed, they are cited in the New Testament parable as among the creatures that take no thought for the morrow. Yet a few of them do store food. The habit of the shrike or butcher-bird, of hanging his victims on thorns or the prongs of barbed-wire fences, is not a torturer's trick, as has been widely believed, but only a bit of packing-plant technique. California woodpeckers wedge acorns into cracks, or into holes of their own drilling, and come back later to consume them.

Often this hoarding habit runs away with itself. The bird or beast goes on storing and storing, in a veritable orgy of acquisitiveness, long after reasonable provision has been made for the future. Such creatures pass the thrift line and become mere capitalists, getting merely for the sake of getting, even losing track of all they have gathered.

An industrious California woodpecker, for example, will hammer away tens of thousands of acorns, and even stick smooth pebbles into his storage-crevices, and leave them there for years unused, while he just as assiduously stores the next season's crop.

Such excess of storing activity invites its own penalty. Bees are notorious for the way they will fill to overflowing whatever cavity they may chance to be inhabiting. Beekeepers know this, and pile super on super, letting them fill all the frames. Then they take away almost all the honey, leaving only enough to carry the bees through to the beginning of another season. And the poor, silly, exploited insects don't seem to have the least idea of what is happening to them.

Science News Letter, December 11, 1948

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PHARMACOLOGY

Filling Prescriptions

➤ HOW TO assure the proper filling of 400,000,000 prescriptions each year is the main subject of a two-year pharmaceutical survey summarized by the American Council on Education.

"The American people need to realize that every time a prescription is taken to one of the 55,000 retail drug stores in this country not only health but oft-times life is at stake." said Dr. Edward C. Elliott, president emeritus of Purdue University, who directed the survey. (*See SNL*, Dec. 4, p. 367).

The survey concluded that there are approximately 96,000 pharmacists in the nation. War-time shortages are being caught up and if the present annual number of graduates totaling 4,300 is maintained there will be a surplus of trained pharmacists in 1950.

The drug store must continue to be a department store, selling banana splits, household supplies, candy, tobacco, cosmetics, etc., the survey admitted. Druggists must be successful businessmen as well as capable professionals.

The typical drug store, the survey implied, has become a community institution, social center and a source of advice dispensed along with medicine by the "Doc" behind the counter.

Recognizing the reasons why liquor is sold in some drug stores, the committee declared as a matter of common understanding that "such sale must be regarded as distinctly detrimental to the public profession of pharmacy."

Among the recommendations made by the survey report are:

Continue accrediting of colleges of pharmacy by the American Council on Pharmaceutical Education, and provide higher salaries and better qualifications for teaching staffs.

Select students for the pharmacy profession by testing before admission, together with explanations to high school students about pharmacy.

Make the present requirements for practical experience for licensure more practical or abolish them.

Take steps toward a six-year course that would lead to a Doctor of Pharmacy degree, supplementing the present four-year B.S. degree.

Study the prescriptions filled throughout the country to determine changes in practice by physicians and the effect of new drugs introduced.

Science News Letter, December 11, 1948

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Books of the Week

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ADVENTURES WITH ANIMALS AND PLANTS—Elsbeth Kroeber and Walter H. Wolff—*Heath*, 600 p., illus., $3.20. A biology text for high schools made very attractive by generous illustration with photographs and drawings.

ANIMALS WITHOUT BACKBONES: An Introduction to the Invertebrates—Ralph Buchsbaum—*University of Chicago Press*, 371 p., illus., $6.50. Any lover of nature or of photography will delight in this beautiful book with the story of invertebrates told in pictures and non-technical language. It also serves as college text and is a new printing of a book first published in 1938.

CAN FARMERS AFFORD TO LIVE BETTER?—Lowry Nelson—*National Planning Association*, 32 p., paper, 50 cents. An Agriculture Committee report.

THE CHEMICAL ARTS OF OLD CHINA—Li Ch'iao-p'ing—*Journal of Chemical Education*, 215 p., illus., $5.00. A charmingly illustrated book on such things as the origin of gunpowder, and early experiments with gold, dyes, soybean products, lacquer and glue.

CLINICAL INVESTIGATION OF BENTONITE-PETROLATUM OINTMENTS AND OINTMENT BASES—Lester Hollander—*Mellon Institute*, 10 p., illus., paper, free upon request direct to publisher, University of Pittsburgh, Pittsburgh 13, Pa. Certain advantages were found for this new type of base, including its moisture absorbing qualities.

THE CONQUEST AND COLONIZATION OF YUCATAN, 1517-1550—Robert S. Chamberlain—*Carnegie Institution of Washington*, 365 p., illus., paper $4.75, cloth $5.50. A history of the Spanish conquest of a province which held not great riches but good agricultural and pastoral promise and the clash between the Montejos of Spain and the Mayas.

DEMANDS FOR LABOR: OPPORTUNITIES FOR RESEARCH—Dale Yoder—*Social Science Research Council*, 40 p., paper, 50 cents.

GROUND-WATER RESOURCES OF REPUBLIC COUNTY AND NORTHERN CLOUD COUNTY, KANSAS—V. C. Fishel, S. W. Lohman, and H. A. Stoltenberg—*University of Kansas*, 194 p., illus., paper, 25 cents. A study of one of the most important of natural resources.

JAMES WATT AND THE INDUSTRIAL REVOLUTION—H. W. Dickinson and H. P. Vowles—*The British Council* (*Longmans, Green*), 57 p., illus., paper, 60 cents. An important chapter in the history of England and of the modern mechanical world.

MINERAL NUTRITION OF PLANTS AND ANIMALS—Frank A. Gilbert—*University of Oklahoma Press*, 131 p., illus., $2.75. The need for such a review of important literature on mineral nutrition became apparent to the author during experiments at Battelle Memorial Institute.

PRINCIPLES OF RADAR—Denis Taylor and C. H. Westcott—*Cambridge* (*Macmillan*), 141 p., illus., $3.50. A concise book for engineers, physicists, mathematicians and advanced students of radio. Of British origin.

THE SCIENCE OF BIOLOGY TODAY—Trofim Lysenko—*International*, 62 p., $1.25. The controversy in Soviet Russia over the theories of genetics as viewed by one of the leading figures opposing the chromosome theory.

VELOCITY-MODULATED THERMIONIC TUBES—A. H. W. Beck—*Cambridge* (*Macmillan*), 180 p., $3.75. Not a text but a technical work for radio engineers. Of British origin.

Science News Letter, December 11, 1948

RADIO

Sound Reproduction More Efficient with Ceramic

➤ A WAR-DEVELOPED substitute for mica in radio condensers, barium titanate ceramic, promises to give superior performance to specialized loudspeakers or submarine sound detection microphones. The barium titanate, when placed in a field of several thousand volts, acts as a "transducer" and converts sound pressure to electric signals or back again with high efficiency.

W. P. Mason of the Bell Telephone Laboratories, reporting in the PHYSICAL REVIEW (Nov. 1), finds that the electrical behavior of barium titanate when fused into a ceramic is very similar to the magnetic behavior of the magnetostrictive nickel alloys that were used successfully in underwater sound projectors during the war. The term "electrostrictive" has been applied to its behavior.

The superiority of the barium titanate ceramic transducer is due to its large mechanical motion from a small electrical signal. In this respect its performance is superior to nickel magnetostrictive materials and is even superior to the much-used rochelle salt crystals. The ceramic has the additional advantage of being affected very much less by temperature changes than rochelle salt, its nearest competitor.

The ceramic is being widely used in new radios and television sets in condensers to replace mica and to give a hundred-fold increase in electric storage capacity.

Application of titanate ceramics to a phonograph pick-up and to a microphone was reported to the Acoustical Society of America meeting recently by H. W. Koren of the Sonotone Corp., Elmsford, N. Y. A metal strip with a thin plate of ceramic soldered to one end or with thin plates soldered to both sides was used with good results.

Science News Letter, December 11, 1948

AERONAUTICS

Airliner Can Be Dropped 10,000 Feet in a Minute

➤ A BIG multi-engine airliner can be made to drop 10,000 feet in a minute by reversing the thrust of the propellers in flight.

Curtiss-Wright Corporation officials who demonstrated the quick drop system listed three advantages:

1. Emergency landings can be made quickly from high altitudes.
2. Military planes can use the maneuver in combat.
3. Less time will be lost at low altitudes by planes which operate most efficiently at high altitudes.

Science News Letter, December 11, 1948

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GLASS LENS, for use with ordinary household incandescent lamps, is quickly attached and held in position to direct the light where wanted by clips similar to familiar lampshade holders. It produces a bright area of considerable size approximately with twice the illumination obtained without it.

Science News Letter, December 11, 1948

WATER-INJECTOR, to add moisture to gasoline entering automobile engines, utilizes the dual fuel principle employed on some airplanes. This easily installed unit is controlled through connection with the accelerator; as the gasoline feed is increased, the supply of water injected into the carburetor automatically increases.

Science News Letter, December 11, 1948

STALL-WARNING device for airplanes utilizes a simple mechanical method of sounding a horn and turning on a light on the instrument board to let a pilot know his plane is approaching a stall. A stall is a condition encountered when a plane climbs too steeply and the air flowing over the wing fails to provide lift.

Science News Letter, December 11, 1948

TINY POWER UNIT for toys, shown in the picture, is operated by two standard flashlight batteries which are inserted at will in the plastic base-box of the engine, and delivers power by moving belt hooked over the hub cap of one of its flywheels.

Science News Letter, December 11, 1948

ANTENNA KITS, for use with FM radio television receivers, contain a base mount to attach to the house and a number of attachment parts which can be selected to meet a particular situation. These new kits for installation men feature a degree of flexibility to meet all local television requirements.

Science News Letter, December 11, 1948

ROOFING PLANK, molded from mineralized wood chips combined with portland cement, combines in a single unit roof-decking, insulation and sound absorption. It is resistant to fire, termites, fungi and moisture.

Science News Letter, December 11, 1948

FENDER TOOL, to remove dents and creases in automobile fenders, is a nine-pound hand tool of horseshoe shape, with one arm extended inward to carry a revolving wheel and the other a lever and contact plate. Plate and wheel are screwed together to flatten the dent.

Science News Letter, December 11, 1948

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